



A.D. 1819 N° 4404.

Inlaying or Combining Metals, &c.

SIR W. CONGREVE'S SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, SIR WILLIAM CONGREVE, of Cecil Street, Strand, in the County of Middlesex, Baronet, send greeting.

WHEREAS His most Excellent Majesty King George the Third did, by
5 His Letters Patent under the Great Seal of the United Kingdom of Great Britain and Ireland called England, bearing date at Westminster, the First day of November, in the sixtieth year of His reign, give and grant unto me, the said Sir William Congreve, my exors, admors, and assigns, His especial licence, full power, sole privilege and authority, that I, the said Sir
10 William Congreve, my exors, admors, and assigns, during the term of years therein mentioned, should and lawfully might make, use, exercise, and vend, within England, Wales, and the Town of Berwick-upon-Tweed, and also in all Your Majesty's Colonies and Plantations abroad, my Invention of "AN IMPROVED MODE OF INLAYING OR COMBINING DIFFERENT METALS OR OTHER HARD
15 SUBSTANCES, APPLICABLE TO VARIOUS USEFUL PURPOSES;" in which said Letters Patent there is contained a proviso that if I, the said Sir William Congreve, shall not particularly describe and ascertain the nature of my said Invention, and in what manner the same is to be performed, by an instrument in writing under my hand and seal, and cause the same to be inrolled in His Majesty's
20 High Court of Chancery within six calendar months next and immediately after the date of the said Letters Patent, that then the said Letters Patent, and all liberties and advantages whatsoever thereby granted, shall utterly

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cease, determine, and become void, as in and by the same, relation being thereunto had, will more fully and at large appear.

NOW KNOW YE, that in compliance with the said proviso, I, the said Sir William Congreve, do hereby declare that the nature of my said invention, and the manner in which the same is to be performed, are particularly described and ascertained in the following description thereof (that is to say):—

The metallic plate or surface, or any other plate or surface made of any other material, such as variety of stones or of porcelain, or the like, capable of withstanding the heat of melted metal, being pierced into any filagree work or pattern intended, a metal softer than itself when two metals are used, or any metal where the plate is formed of corresponding material, is then fluxed and run at the back of the principal plate, so as to form a second plate, penetrating and filling all the filagree or interstices of the pattern cut through the principal plate, which may be very completely effected by making the cast in a similar way to that in which stereotype plates are produced, so that after the front is cleaned off and polished the most beautiful enlaying, adaptation, or combination of the two substances is made. Thus gold or silver may be enlayed in iron, or steel, or lead, tin, or type metal; and many other metals and alloys may be enlayed in gold, silver, or brass, or any other metal or substance requiring a higher temperature to flux it than that required to flux the substance to be enlayed, and in this way it is evident that a combination of more than two metals or substances may be effected on any given surface. Now the uses to which this mode of enlaying, or adaptation, or combination may be applied are various. Thus it may be used to form a vast variety of ornamental works for furniture, or other such purposes not necessary to be specified, in which the combination is supposed to remain permanent; or it may be made so that the two or more plates or substances may be separated after having been thus accurately, and, as it may be termed, mathematically adapted, by making the filagree work so that it will deliver the second plate after cooling it, which case it may be applied to obtain a gauge of actual identities of form, which might be of great importance in determining the genuineness of hard money. It might also, when made to separate, be applied to printing in two or more colours by forming a compound plate capable of separating after being engraved upon, to receive different colours on the different parts, and then uniting those parts so as to print all these different combinations of colour at once on the paper or other material intended to receive them. And as in this way it appears to be capable of producing a more refined, delicate, and complicated combination of colour in a coloured print than by any other known mode,

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so it appears that it may be successfully applied to produce a new description of work which could only be imitated in the way in which it was produced, and which, therefore, would tend to throw very great difficulties in the way of the forgery of bank notes or other documents which it is desirable to protect,
 5 all which may, by various mechanical means, be so arranged as to produce its effects with so much ease and rapidity as to render it fully competent in actual practice to the various important uses thus founded upon this mode of enlaying or adapting or combining the various substances as above, or by any other means of softening one of the substances.

10 In witness whereof, I, the said Sir William Congreve, have hereunto set my hand and seal, this Twenty-ninth day of April, in the year of our Lord One thousand eight hundred and twenty.

WILLIAM (L.S.) CONGREVE.

15 **AND BE IT REMEMBERED**, that on the Twenty-ninth day of April, in the year of our Lord 1820, the aforesaid Sir William Congreve came before our said Lord the King in His Chancery, and acknowledged the Specification aforesaid, and all and every thing therein contained and specified, in form above written. And also the Specification aforesaid was stamped according to the tenor of the Statute made for that purpose.

20 Inrolled the Twenty-ninth day of April, in the year of our Lord One thousand eight hundred and twenty.

LONDON:

Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
 Printers to the Queen's most Excellent Majesty. 1857.



A.D. 1819 N° 4419.

Manufacture of Bank Note Paper.

CONGREVE'S SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, Sir WILLIAM CONGREVE, of Cecil Street, Strand, in the County of Middlesex, Baronet, send greeting.

WHEREAS His most Excellent Majesty King George the Third did, by
5 His Letters Patent under the Great Seal of the United Kingdom of Great Britain and Ireland called England, bearing date at Westminster, the Fourth day of December, in the sixtieth year of his reign, give and grant unto me, the said Sir William Congreve, my exors, admors, and assigns, His especial licence, full power, sole privilege and authority, that I, the said Sir
10 William Congreve, my exors, admors, and assigns, during the term of years therein mentioned, should and lawfully might make, use, exercise, and vend, within England, Wales, and the Town of Berwick-upon-Tweed, and also in all Your Majesty's Colonies and Plantations abroad, my Invention of "CERTAIN
" IMPROVEMENTS IN THE MANUFACTURE OF BANK NOTE PAPER FOR THE PREVENTION
15 " OF FORGERY;" in which said Letters Patent there is contained a proviso that if I, the said Sir William Congreve, shall not particularly describe and ascertain the nature of my said Invention, and in what manner the same is to be performed, by an instrument in writing under my hand and seal, and cause the same to be inrolled in His Majesty's High Court of Chancery within six
20 calendar months next and immediately after the date of the said Letters Patent, that then the said Letters Patent, and all liberties and advantages whatsoever thereby granted, shall utterly cease, determine, and become void, as in and by the same, relation being thereunto had, will more fully and at large appear.

Congreve's Improvements in the Manufacture of Bank-note Paper.

NOW KNOW YE, that in compliance with the said proviso, I, the said Sir William Congreve, do hereby declare that the nature of my said Invention, and the manner in which the same is to be performed, are particularly described and ascertained in the following description thereof, (that is to say):—

The object of this Invention is to form certain tests of genuineness in the 5 paper on which bank notes are to be printed, which cannot be imitated after the paper is made, as is at present the case with the ordinary paper used for bank notes, but which tests or distinguishing marks or peculiarities must indispensably be given to the paper in its original construction or formation at the paper mill, which no ordinary forger can accomplish, so that no forgery can 10 be completed without the aid of paper makers. And the object is, moreover, to make these tests or marks as simple as they can be, so that they may be immediately recognized and understood by the most unlearned persons, that all orders of people may be equally able to distinguish a bad note from a good one, by observing whether the said tests exist or not in any note that may be 15 offered. Of these tests, and of the mode of producing them, there are various modifications and gradations, which I shall here specify.

First, the very texture, smoothness, and thinness of bank paper united with a new and peculiar degree of strength, and with a peculiarly transparent water mark, so bright that it cannot be imitated either by friction, pressure, or 20 varnish, may be made to form a test of genuine bank paper, which can only be imitated in the original fabrication of the paper and not subsequently. This smoothness and thinness are to be accomplished by a particular process in preparing the material by mashing or rubbing the pulp to pieces instead of cutting it, by which the pulp is made of a fine, long, and flakey staple instead 25 of a short nature, so that the texture of the paper becomes tough and elastic instead of being weak and brittle. This property also may be increased by the mixture of certain transparent vegetable and animal substances, such as gum, isinglass, parchment cuttings, and the like, by which a peculiar degree of tenacity and transparency is attainable, and the due proportions of which 30 can best be regulated by the experiment of the workmen. This paper, when dipped singly, will afford a much more brilliant water mark than ordinary paper, from the nature of the materials, which may be augmented by forming the water mark of very thin sheet copper or brass instead of wire, or by mixing both. The water mark, however, of such single colourless paper cannot be 35 made permanently indelible. To accomplish this most desirable end, therefore, in white paper, by which a certain test may be obtained in such paper of its not being a forged water mark, this paper must be dipped in a vat of the thinnest possible material twice for once couching it, and the transparency and

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distinctness of the water mark will be improved by dipping the mould in clear water between the first and second dips in the pulp, by which means a permanent difference of thickness between the substance of the water mark and of the plain part is created, whereas the ordinary water mark is little more than
 5 an impression on the surface of the paper. A note thus produced, though it need not, with the fine materials proposed, be thicker than an ordinary note, will on the whole be much stronger than the common note, because it will in fact be more close or dense in its texture, though not thicker. The tests of the genuineness of the white bank note paper which I thus manufacture are
 10 indeed extremely delicate and beautiful, but they are not of the same decided character and universal manifestation as those which I shall proceed to explain.

These are formed by the introduction of a coloured layer of pulp in combination with white layers, and are thus effected:—The material being prepared
 15 and reduced into the finest possible pulp, as above stated, a mineral dye is added to one of them, or a vegetable dye will answer if the pulp be made of material previously dyed. Thus I have found the Adrianople red cloth form a most excellent coloured pulp, not only because the colour is peculiarly clear and permanent, but because it is a dye most difficult to give.

20 The pulps being thus prepared, the following different modifications of this paper may be made for the purpose of giving the test or mark required, and which is certainly not to be imitated but by a similar process to that of the original manufacture. This paper should be made in two different moulds, one a plain one, and the other with a water mark either as above of thin
 25 copper plate, or wire, or both, as follows:—

First, by three dips and three couchings. A dip of the white pulp being taken in the plain mould, is to be couched; then a dip with the water-mark mould is taken of the coloured pulp, and that couched on the white, and again
 30 a third dip of white in the plain mould laid upon this, the layers of each pulp being taken as thin as possible; this completes the formation of the sheet, and the felt is then laid on. The paper thus produced contains a dyed or coloured layer with a most brilliant, distinct, and permanent or indestructable water mark between two thin layers of white. The colour therefore is in the heart of the paper, and is scarcely perceived until held up to the light. Now it
 35 is obviously impossible to place the colour thus in the interior except in the first formation of the paper. No person can, after the paper is made, dye the heart of a sheet of paper without dyeing the exterior also; nor can there be any test of genuineness devised whereof the proof can be more simple or self-evident than the having thus merely to ascertain the fact of the colour being

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in the interior of the paper by holding it up to the light, and thence deducing that this paper must have been made under circumstances scarcely attainable by the forger, or indeed I may say wholly unattainable by him, if due attention be paid to the perfection of the manipulations in the original paper, since it would be impossible to produce the triple paper in such perfection without 5 working in large quantities, and by very expensive and cumbrous machinery.

The second mode of producing this paper is by three dippings and two couchings.

The triple paper made as above might be objected to for certain banks on account of its being too thick. In that case, therefore, this paper may be 10 made, not as above by three dippings and three couchings, but with three dippings and only two couchings. By dipping first in the coloured pulp, then the white upon it in the water mark mould, then couching both these layers together, which brings the coloured layer uppermost, then dipping the second white separately in the plain mould, and couching it on the coloured layer. 15 There is also a third mode of producing this paper by three dippings and only one couching. This is effected by dipping first the white, then the colour, and then the white pulp again, one upon the other in the same mould, and couching the three layers at once. These three different modes of combining this paper give three different gradations of substance, whereof the latter is the 20 thinnest, and also the most rapidly made. This latter, however, requires more dexterity in the workman, and is, perhaps, for that reason the best calculated for the desired security, while its thinness places it still further from any spurious imitation that might be attempted by pasting three sheets of thin ready-made paper together. In those modifications of the triple paper where 25 more than one couching are used, a gauge is required in order to place one layer exactly over the other, and for this purpose a very simple instrument has been contrived, being a frame with hinges, to allow it to be raised and thrown back when the felt is laid on, and yet always to fall down on the same spot on the felts, so that by placing the mould into the angle of this frame it 30 is sure always to be couched exactly in the same situation, and therefore to place the layers exactly over one another. This frame is further constructed so that it will rise and fall on two fixed standards according to the number of felts on the post. The construction of this instrument is so simple that there can be no doubt of any person accustomed to paper making compre- 35 hending it. The test of this triple paper, as it may be termed, may be somewhat strengthened by leaving a margin of the interior coloured layer bare all round one of the faces of the note, which any paper maker will know may be easily effected by taking a smaller deckle for the last couching. By this

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means the fact of the colour in the interior appearing deeper when looked through than when looked at is established, because the colour in this margin, though the same as that in the interior, being superficial, appears paler when looked through, that is to say, the effect of the superficially coloured margin
5 is precisely the converse of the colour in the centre of the paper, though they are the same tints. Whence it is deduced that if that which is superficial looks paler when held up to the light, that which looks darker so viewed must be in the interior, and thus every doubt as to the test is removed by proofs existing in the note itself. I have already described a mode of improving
10 the brilliancy of the water mark in white bank note paper by a double layer of colourless pulp. Here, therefore, it may be observed that this effect may be still heightened by giving a very faint tint in one of those layers. It is true this double paper would not afford all the advantages derivable from the tests of the interior colour, because all superficial colour may be laid upon ready
15 made paper. Nevertheless, certain peculiarities in the mode of laying in this colour may be accomplished, which it would be extremely difficult for the forger to achieve otherwise than by means of pulp in the original formation of the paper. Thus it may be laid on in a mottled state by a peculiar formation in the mould; and by the use of a thin copper strainer instead of wire in the
20 sieves it may be laid on so as to produce a sort of shade to the transparent water mark; two descriptions of water mark, one dark and the other transparent, being thus mixd by means of the two layers of paper, which would produce a most beautiful combined effect, to be only imitated in the original construction of the paper, and being perfectly indestructable. Such paper would also
25 be thinner than the triple paper. The paper thus made of different layers, whether double or triple, with the coloured layer, or without it, is susceptible of another indelible description of mark in the interior, which cannot be produced but in the first formation of the paper; thus after the first layer is couched, it may be printed upon at the mill either in colour or in black. I
30 have thus printed various forms or figures, and even the promissory part itself of the note, in the very heart of the paper before it was finished, that is to say, forming part of the first process at the mill. This printing, whatever it may be, may then be covered with the outer layer of very fine transparent pulp, either plain or with a transparent water mark mixing and combining if required
35 with the printed character in the interior. By this exterior covering it is obvious that this printing is not only protected from injury, but that it cannot be set off or rubbed down for the purposes of imitation. There is another improved manipulation as to the printing upon bank notes similar to the foregoing one, and productive of the same effects, namely, that the printing

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may in like manner be performed upon the paper in an unfinished and damped state, and previous to its being sized. This manipulation, on the same principle as the last-mentioned process, will protect the printing from injury, and from being sett off or rubbed down for the purposes of forgery, though not so completely as the last-mentioned mode, while it also improves the impression. 5 And this also may be best performed by combining the operation of printing with the original formation of the paper at the mill, which necessarily places any improved effect thus attainable still further out of the reach of the forger. In short, it is evident that there is an infinite variety of these tests to be obtained by the different modifications of the principles herein stated, which it 1 is not necessary further to describe.

In witness whereof, I, the said Sir William Congreve, have hereunto set my hand and seal, this Third day of June, in the year of our Lord One thousand eight hundred and twenty.

WILLIAM (L.S.) CONGREVE. 1.

STEPHEN. AND BE IT REMEMBERED, that on the Third day of June, in the year of our Lord 1820, the aforesaid Sir William Congreve came before our said Lord the King in His Chancery, and acknowledged the Specification aforesaid, and all and every thing therein contained and specified, in form above written. And also the Specification aforesaid was stamped according to the tenor of the 21 Statute made for that purpose.

Inrolled the Third day of June, in the year of our Lord One thousand eight hundred and twenty.

LONDON:

Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty. 1856.

[Second Edition.]



A.D. 1820 N^o 4521.

Printing in Colours.

SIR W. CONGREVE'S SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, Sir WILLIAM CONGREVE, of Cecil Street, Strand, in the County of Middlesex, Baronet, send greeting.

WHEREAS His most Excellent Majesty King George the Fourth did,
5 by His Letters Patent, under the Great Seal of that part of the United Kingdom of Great Britain and Ireland called England, bearing date at Westminster, the Twenty-second day of December, 1820, in the second year of the reign, give and grant unto me, the said Sir William Congreve, my exors, admors, and assigns, His especial licence, full power, sole privilege and
10 authority, that I, the said Sir William Congreve, my exors, admors, and assigns, during the term of years therein mentioned, should and lawfully might make, use, exercise, and vend, within England, Wales, and the Town of Berwick-upon-Tweed, my Invention of "**CERTAIN IMPROVEMENTS IN PRINTING IN ONE, TWO, OR MORE COLOURS;**" in which said Letters Patent there is contained
15 a proviso, that if I, the said William Congreve, shall not particularly describe and ascertain the nature of my said Invention, and in what manner the same is to be performed, by an instrument in writing under my hand and seal, and cause the same to be inrolled in His Majesty's High Court of Chancery within six calendar months next and immediately after the date of the said Letters
20 Patent, that then the said Letters Patent, and all liberties and advantages whatsoever thereby granted, shall utterly cease, determine, and become void, as in and by the same, relation being thereunto had, will more fully and at large appear.

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NOW KNOW YE, that in compliance with the said proviso, I, the said Sir William Congreve, do hereby declare that the nature of my said Invention, and the manner in which the same is to be performed, are particularly described and ascertained in and by the Drawings hereunto annexed, and the following description thereof (that is to say):—

This machine, in its simplest form for printing in one colour, consists of a strong external fixed frame of cast iron A, B, C, D, E, F, G, Figures or Diagrams 1 and 2, Plate 1 having an internal moveable horizontal frame or carriage H, I, K, of wrought iron, of which an end view is shewn in Fig. 2, Plate 1, called the printing carriage, which slides backwards and forwards horizontally in brass grooves *a, a*, Fig. 2, Plate 1, fixed to the inside of the pieces A, B, E, of the fixed external frame. To this horizontal moveable frame or carriage is attached the brass cheek pieces or standard carriages L, M, N, on which the printing cylinders O, O, O, is mounted. The inking rollers P, P, P, are also attached to and carried by this internal moveable frame or carriage H, I, K, so that the whole of this internal moveable work, consisting of the printing cylinder and the inking rollers, moves backwards and forwards together upon this wrought iron frame or carriage. The distributing surface over which the inking rollers pass backwards and forwards every time an impression is taken, and from which they obtain their immediate supply, is attached to the fixed frame A, B, E, and this surface receives its supply of ink from a reservoir roller R, fixed to the external frame by means of a fourth roller or messenger S, attached to the moveable frame or carriage, which roller S touches the reservoir roller R when the moveable frame has reached its extreme point, moving forwards the roller S, returning with a fresh but very small supply of ink, which it deposits on the distributing surface Q, Q, as the frame moves back. Now, the whole of this moveable work is set in motion backwards and forwards at the centre T of the crank U, which crank moves the radius X, W, to and fro through the angular space W, W, by means of the rod V, U, the radius X, W, driving the horizontal frame or carriage, and all the parts attached to it, backwards and forwards through a space equal to W, W, by means of the driving rods Y, Y, connecting the radius X, W, with the carriage H, I, K. The form or plate Z, Z, from which the impression is to be taken, is attached to the horizontal bars A, B, E, of the external fixed frame, so that in this construction, contrary to the ordinary principle of printing machines, the inking rollers and printing cylinder are moveable instead of being fixed and the form or plate and distributing surface are fixed instead of being moveable. The operation of printing is thus performed:—The printing cylinder and inking rollers fixed on the moveable frame or carriage, as above

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described, are moved backwards and forwards by a winch, or otherwise, at the centre of the first motion T, so that the three inking rollers pass from the distributing surface, every time an impression is to be taken, completely over the form or plate Z, Z, and back again, and that the printing cylinder, having taken up
5 the sheet of paper at *a*, rolls with it over the form or plate Z, Z, as the cylinder advances, takes the impression, discharges the paper at *b* in retiring, and goes back to receive another sheet, as before, at *a*, and so on. The paper is taken upon the cylinder, confined to it while printed, and subsequently discharged from it by pairs of endless tapes *d, d, d, d, d*, winding round rather more than
10 one half the cylinder from the pulley *c* to the pulley *b*, and passing from the pulley *b* back to the pulley *c* again, as shewn in the Diagram, Fig. 1, Plate 1, by the red lines *d, d, d, d*. Now, in order that the paper should be duly discharged at *b*, it is necessary that the cylinder should always revolve in the same direction, though horizontally it moves backwards and forwards, for if the cylinder did
15 not continue its revolution in the same direction, the paper, after being printed would return backwards as the cylinder retires, and interrupt the progress of the fresh sheet coming on; but by the cylinder constantly revolving in the same direction, the printed sheet passes off below at *b*, while the fresh sheet is coming on at the top of the cylinder at *a*. This constant rotary motion in the
20 cylinder, while moving backwards and forwards, is produced by the rising and falling racks *e, e*, and *f, f*, which racks are thrown alternately in and out of geers with the toothed segment *g, g, g*, on the side of the cylinder. The lower rack being always in geer as the cylinder moves forwards to print, and the upper rack being in geer when it moves backwards after having printed, hence,
25 therefore, whether the horizontal motion of the cylinder is forwards or backwards, it always revolves in the direction *h, i*. These racks are alternately raised and lowered in and out of geer by being mounted on brass cranks *m, n, o, p*, at their four extremities, those cranks being connected in pairs by the rods *q, r*, so that both these racks rise or fall at the same instant, one into and
30 the other out of geer alternately; and this alternate motion in the cranks, rods, and racks, thus connected together, is given alternately by the tappets *t* and *s*, first by *t* striking the crank *m* forwards when the cylinder has reached its extreme point in front, throwing down the racks by the blow, so that the lower rack *e, e*, falls out of geer as the upper one *f, f*, falls in, and vice versa; the rack *e, e*, being raised again into and *f, f*, out of geer by the tappet *s*
35 striking the crank *p*, when the cylinder has reached its extreme point of its horizontal motion backwards. The paper is laid on by means of a moveable carriage, called the paper carriage, consisting of a frame *u, u*, having a large and small roller *w, w*, and *x, x*, working at each end of the carriage, with an

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endless band or cloth round them, shewn by a red line y . This band or cloth is carried round these two rollers and back again by the rotary motion of the large roller w , and the motion is given to that roller by a wheel attached to it, which works, either by simple friction or by teeth, against either a plain rail or a rack Z^1, Z^2 , so that as the whole of the carriages moves backwards and forwards, which it is constructed to do, in grooves on the upper bar c, d , of the fixed external frame, the band is made to run, either one way or the other, by the revolution of the wheel w , this way or that, as the paper carriage moves forwards or backwards. This motion of the band is adjusted by construction, so that it is equal to the rotary motion of the printing cylinder, and the carriage, being constructed as above, is driven backwards from Z^1 to Z^2 by the carriage of the printing cylinder coming in contact with it in its return to receive the fresh sheet, the whole of this carriage being drawn forwards again by the suspending weight No. 1. 5 10

Having, therefore, thus described the different parts and actions of this laying-on or paper carriage and its band, the operation of laying the paper on the band or cloth, so that the tapes on the printing cylinder shall take it from that band and transfer it to the printing cylinder, will be easily understood. The paper is laid upon the band at y, a , the edge of the paper coming to the front edge of the band a , where that band turns round the smaller roller. In this situation the paper is found on the band or cloth when the cylinder returns for a fresh sheet, and the underneath side of the tapes running round the pulley c , thus coming in contact with the upper surface of the paper. These tapes, partaking of the rotary motion of the cylinder, draw the paper off the laying-on band on which it was first laid, and transfer it to the printing cylinder, while the laying-on carriage is pushed back by the cheek pieces L, M, N , of the cylinder, and the band y, y , being, as above described, in motion equal to that of the cylinder, and in the same direction, that motion of the band assists the tapes in transferring the paper from itself to the cylinder, and prevents its being either torn or puckered. The carriage having thus parted with the paper in its recoil, returns as far as $z1$ with the cylinder, where it receives a fresh sheet from the hands of the person employed to lay on, while the cylinder is proceeding forward to print the sheet it has just taken up. That part of the cylinder under the paper where the impression is to be received is raised above the rest of the surface of the cylinder by a blanket, covered either with leather or parchment, which may be termed the *tampan* sheet, so that this raised part only touches the plate in printing, while the remainder of the cylinder rolls over it without touching in printing, followed by the inking rollers, as above described, to charge the plate with fresh ink 15 20 25 30 35

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after every impression. It remains only to state, that the sheet, after being printed, is discharged from the cylinder at the discharging pulley *b*, where the tapes quit the cylinder and return, after making an angle to clear the cylinder, back to the pullies *c*. The sheet thus discharged is received from the cylinder
5 on the long endless band or cloth No. 2 and 3, mounted on and moving backwards and forwards with the main printing frame or carriage. This band runs round from 2 to 3, having in addition to the general motion of the frame or carriage on which it is mounted a motion of its own received from the roller or pulley, which motion being given by the tapes of the printing cylinder must
10 be equal to the motion of that cylinder, so that this band takes off the discharged sheet without puckering as fast as the tapes and cylinder part with it, and finally carries and drops it beyond the limits of the machine on to a table placed to receive it, and thus the operations of this machine in its simplest form, viz^t, the printing in one colour for any general purpose,
15 are so far completed; comprehending, therefore, thus far the mode of laying on the paper, inking the rollers from the distributing surface, and inking the plates from the rollers, also the subsequent printing and throwing off the paper where one colour only is used; it will be now easy to understand the operation of printing in two or more colours at a single impression by a
20 similar machine. For this purpose the plates must be constructed on a principle entirely different from that of any other plates, which principle forms a part of this system; the plate is, in fact, a combination of two or more plates, according to the number of colours to be printed. In the description, however, to which I shall now proceed, suppose two colours and two plates only. In the
25 combination of these plates, certain raised parts of the lower plate come up through corresponding apertures in the upper plate, so as to form one printing surface of the two plates; the interstices in the upper plate being formed in any desired pattern of filagree work, as it may be termed, and the relief parts of the lower plate being fitted exactly into those apertures, either by casting
30 one metal plate into another, the metal of the lower plate being in that case softer and easier fused than that of the upper plate, or they may be fitted of two metal plates of equal hardness, either by hand or by casting each part in separate moulds duly adjusted.

Persuing, therefore, the operation of printing in two colours, it must be
35 understood that these double plates are separated to be coloured with the different colours, and united to print these different colours at one impression. To effect this, it is evident that, in addition to all that has been already described, the machine must be furnished with two sets of inking rollers, reservoirs, and distributing surfaces, and that it must also have the means of sepa-

Congreve's Improvements in Printing in One, Two, or more Colours.

rating and closing these plates at the proper times for the different operations of inking and printing. Now, the first of these necessities is provided for by the second tier of inking rollers, expressed by dotted lines No. 4, 5, 6, attached to the moveable carriage, exactly on the same principle as those already described; and this second sett of rollers must, like the first sett, pass over a 5 second distributing surface No. 7, fixed like the first surface to the main frame of the machine. The separation and closing of the plates is performed by the excentric wheel, expressed also by dotted lines No. 8, 9, 10, 11, working on the same centre as that of the crank above described, which sets the moveable frame or printing carriage in motion. This excentric is grooved all round its peri- 10 phery, and in this groove works a roller 12 on the end of the rod 12, 13, that rod being steadied and confined to its due action by the radius 12, 14, connected with a standard or arm 15, 16, 17, having a knuckle joint in it 16, the top of which standard is connected with the table 17, on which the lower plate 18, 18, is fixed, so that when the joint of the standard or arm is bent 15 into the position 15, 16, 17, the lower plate 18, 18, is drawn down from the upper one z, z, moving in its descent very accurately and steadily in vertical bird's-mouth grooves in two uprights of the fixed external frame of the machine 19, 20, and again, so that when the joint is shut the lower plate is again thrown into the upper one, whereby the upper surface of the projecting parts of the 20 lower plate are again made to coincide with the upper surface of the upper plate. Things, therefore, being thus constructed, it follows, that while the roller of the rod 12, 13, is working in the groove of the larger circle from 8 to 9, the joint of the standard will be thrown back, and the plates remain separated for inking by their respective rollers passing over them; but that as the 25 roller 12 passes from the larger to the smaller circle of the excentric, that is, from 9 to 10, the joint will be straightened, and the plates closed, and that they will remain closed for printing while the roller of the rod works in the groove of the smaller circle from 10 to 11, that they will again open when that roller passes again to the larger circle from 11 to 8. These portions of circles must, 30 therefore, be calculated and placed on the periphery of the excentric, so that the inking rollers shall pass backwards and forwards over their respective plates while the end of the rod works in the larger circle from 8 to 9, and so also that the cushion and sheet on the printing cylinder shall roll over the plates while the end of the rod is working in the smaller circle from 10 to 11, 35 (that is to say,) while the plates are closed for printing, after having each of them been inked by their respective rollers. In every other respect the operation of printing in two colours is exactly the same as that first described of printing in one.

Congreve's Improvements in Printing in One, Two, or more Colours.

From the foregoing description also, it will be evident that where three or more colours are used the same process will apply, merely by having an additional tier or tiers of inking rollers, distributing surfaces, and plates; the raised parts of the lower plate intended to permit the third, fourth, or other last colour passing as before through interstices in the different plates above it; all these plates being connected to the table 17 by jointed braces, similar to those of a compound parallel ruler, so that all the plates may be duly opened to receive their different coloured inks as the table descends by the bending of the joint of the standard, and that they may be closed by its straightening again; to effect which it only requires a greater quantity of action in the table falling or rising. It is here necessary to state, that where two or more colours are used, the upper plate Z, Z, cannot be attached by simple cross bars to the external fixed frame, as where only one colour is required for common printing, as those cross bars would be in the way of the necessary connection of the printing rollers with the moveable or printing carriage, and prevent the due quantity of horizontal motion in this carriage from one end to the other; the upper plate Z, Z, must, therefore, in all cases where more than one plate are used, be supported on the longitudinal horizontal bars 21, 22, very faintly shaded in the Diagram Plate 1, which longitudinal bars must be of sufficient length to allow all the connecting parts to move clear from one end to the other; the printing end must be attached to the outer frame at their extremities by the cross bars 23, 24, on one of which cross bars 23 the reservoir roller R, with its doctor plate, may be very conveniently placed. These longitudinal bars also answer another good purpose where more than one plate is used, inasmuch as being elastic from their length, they give a little to the pressure of the printing cylinder rolling over the upper plate, and thereby allow the upper plate to be pressed close down to the lower plates, which are firmly supported by the standard then in its vertical position under the table 17. This same elasticity also, by yielding a little, protects the edges of the projecting parts of the lower plate or plates when they are thrown up into the apertures in the upper plate by the straightening of the standard 15, 16, 17.

Plate 2 is a finished Drawing of every part of this machine for printing in two colours as now actually in use at Somerset House for the new coloured stamps of the country bank notes; this plate consists of an elevation, Fig. 1; an end view, Fig. 2; and a plan, Fig. 3. It is not, however, necessary, after the very detailed description given of the Diagram Plate 1, to go through all the parts of this Drawing Plate 2, which will be sufficiently intelligible by inspection to those who have examined the Diagrams, some variations and additions in the final construction must, however, be noticed; thus, the first

Congreve's Improvements in Printing in One, Two, or more Colours

motion is given by a winch on the axis of the fly wheel *a, a, a* which communicates with the crank and excentric by means of a band *B*, and two riggers *C, C*, and *D, D*, Figs. 1, 2, and 3.

The next important variation to be noticed is, that instead of one distributing surface as supposed in the Diagram, this part of the machine consists, for the better distribution of the ink, on which all fine printing must depend, of two circular horizontal surfaces or plates *E, E*, Figs. 1 and 3, which plates are made to revolve every time the inking rollers pass over them through a very small arc in contrary directions, by the motion of an endless line or catgut band, coloured red, 1, 2, 3, 4, 5, 6, &c., running over the pulley *G*, which is loose, round grooves in the upper set of circular plates, and from thence back to the pulley *F*, fixed on its axis, from thence down to the second set of circular plates *H, H, I, I*, round the grooves in their outer edges, and up again to the pulley *G*; this line or catgut band, having a small collateral pulley *J*, seen only in the plan, Fig. 3, to tighten it. The pulley *F*, which gives motion to this line or catgut band, receives its small intermitting angular motion at intervals by means of the ratchet wheel 22, divided into 19 teeth, which ratchet wheel is moved one tooth every time the printing carriage advances and one tooth every time it recedes by means of a hook *K*, which catches in these teeth by the rising and falling of the rod *L*, one extremity of which works in a small excentric *M, M*, turning on the axis as the large excentric, see Fig. 1, Plate 2. By this arrangement, therefore, a small angular motion takes place every time the inking rollers pass either way over these surfaces, by which means the most perfect and uniform distribution of the ink on the rollers is secured without any fear of an irregular or streaky accumulation in any part. The reservoir roller also moves through a small arc every time the surfaces move, so as to bring fresh ink in contact with the messenger roller; and this motion is given by means of a line over the pullies 20 on the spindle of the reservoir roller, and 21 on the axis of the ratchet wheel. There remains to be described the counterpoise weights *N, N*, Figs. 1, 2, 3, for the table and lower plates, which, being suspended by lines over the pullies *O, O*, work in brass boxes, and cause the table, which is of considerable weight, to be raised and to descend easily and uniformly to facilitate and equalize the motion of the rising and falling racks which turn the printing cylinder; those racks are also counterpoised by a weight working in a brass box *P*, Figs. 1 and 3. To carry the printed sheet more rapidly out of the machine, an additional endless band *Q, Q*, is used, on which the paper is discharged from the first discharging band *R, R*, the lower band *Q, Q* being mounted on the fixed frame of the machine, and not moving backwards and forwards with the printing carriage as the upper

Cornpreve's Improvements in Printing in One, Two, or more Colours.

5 b d it does, which is attended with some inconvenience from not always discharging the sheet in the same place. There remains now only to describe the small fan roller S, which revolves constantly in a contrary direction to the printing cylinder, the surface of which it brushes so as to ensure the discharge
 10 of the paper after printing on the band R, R. There are, of course, certain parts of the machinery here described which are necessarily common to other printing machines, such as the tapes, inking rollers, reservoir cylinders, and doctor plates, which it is not the intention of this Patent to describe as new; I claim, however, under this Patent as a novelty the mode of taking on the
 15 paper by the moveable paper carriage above described, and of carrying it forward to be printed and afterwards discharged by the combined horizontal and rotary motion of the printing cylinder, as effected by the horizontal frame or carriage, and by the rising and falling racks above described, whether in printing with one or more colours.

15 I claim, also, the mode of printing in two or more colours at one impression by the compound plates, above described as fitting into each other, so as to bring certain parts of each plate to form one printing surface, whether those plates be formed by casting metals of different degrees of fusibility into one another, or be fitted by hand, or be cast of the same metal by moulds duly
 20 adjusted, or whether they be partly wrought by hand and partly cast; whether they be of steel, iron, brass, stereotype, or any other metal or mixture of metals, or be of wood, ivory, or any other substance whatever, in whatever way made, fitted, and combined for the purposes above specified. I claim, also, the mode of inking the same separately with different colours, and of
 25 uniting them to print these different colours at one impression with the apparatus herein specified. And I further claim as new the equal distribution of the ink by means of surfaces revolving on axes at right angles to the plane in which the inking rollers move, whether those surfaces are in continual rotary motion or whether they revolve and rest at intervals; and also whether the
 30 machine be furnished with one or more such surfaces.

And, lastly, I claim a variation of this machine, as shewn by Plate 3, which may be called my double printing press, as it prints from the same form or plate with the back motion of the printing carriage as well as with its forward motion, and therefore does double the work in the same time. In this
 35 machine there are two printing cylinders A and B, a, b, Fig. 3, similar to those above described, moving on one main carriage, but having two laying-on carriages, one to each cylinder, at the opposite ends of the machine; and two sets of rising and falling racks, one to each cylinder; having also two sets of the discharging bands, one at each end of the machine, with two revolving

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inking surfaces C, C, D, D, one sett of inking rollers E, F, G, *e, f, g*, two messenger rollers H, I, *h, i*, two reservoir rollers J, K, and one plate or form L, M. Now, the main carriage moves through a horizontal space equal to A, *a*, or I, *i*, so that each of the messenger rollers touches its respective reservoir roller each way. In moving backwards and forwards, therefore, each cylinder moves every time completely across the plate or form, and the inking rollers are fed alternately from each distributing surface, but pass both ways over the form or plate, which is therefore prepared to print the paper alternately brought by both the printing cylinders A and B. Two men are required to lay on, one for each cylinder, so that the utmost is made of the power and time employed, as two impressions are taken from the same form or plate at every revolution of the crank which gives the first motion, whereas in the machine above described only one impression is taken by the same action. This double press is supposed to be principally applied to the printing in one colour for general purposes, though it is evident that by making the excentric above described revolve twice while the crank revolves only once, the operation may be equally applied to printing in different colours. By a similar arrangement to that in Plate 3, if we suppose the space L, M, equal to the reception of two plates or forms, it is evident that a different form might be printed by each cylinder; that is, supposing *x*, M, and *x*, L, to be different forms or plates, then might the cylinder A be made to print from the form *x*, L, only, and the cylinder B only from the form *x*, M; and, by due increase of action, these forms might, of course, be of any size.

Another variation of this principle of printing press, where the forms or plates are at rest and the printing cylinder in motion, is equally practicable by the arrangement of two printing cylinders for turning paper from one cylinder to the other, so as to print on both sides. In this case the two forms must be at the extremities of the machine, and the two printing cylinders in the centre of it.

To conclude, the advantages of this system of printing machines, when applied to common printing in one colour, is, that by having the form stationary and the printing cylinders in motion, those parts of the machine which are necessarily the heaviest are at rest, and those parts which are capable of being made the lightest are the parts moved, by which, it is evident, not only that power is saved, and consequently increased rapidity obtained, but that the far and wear and tear of the machine is much reduced. There is no doubt but that the double machine described in Plate 3, 40 impressions might be taken in a minute without injury to the machine from its speed. When, also, this system of printing is applied to two colours, not only does this same advantage

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exist, but, by the apparatus here described, the most perfect and beautiful description of the register of colour ever devised is attainable.

In witness whereof, I, the said William Congreve, have hereunto set my hand and seal, this Twenty-second day of _____, in the year of our

5 Lord One thousand eight hundred and twenty-one.

WILLIAM (L.S.) CONGREVE.

AND BE IT REMEMBERED, that on the Twenty-second day of June, in the year of our Lord 1821, the aforesaid William Congreve came before our said Lord the King, in His Chancery, and acknowledged the Specification
10 aforesaid, and all and every thing therein contained and specified, in form above written. And also the Specification aforesaid was stamped according to the tenor of the Statute made for that purpose.

SIMEON.

Inrolled the Twenty-second day of June, in the year of our Lord One thousand eight hundred and twenty-one.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.

[Wt. 57—25/5/1910.]

FIG. 1. Diagram.

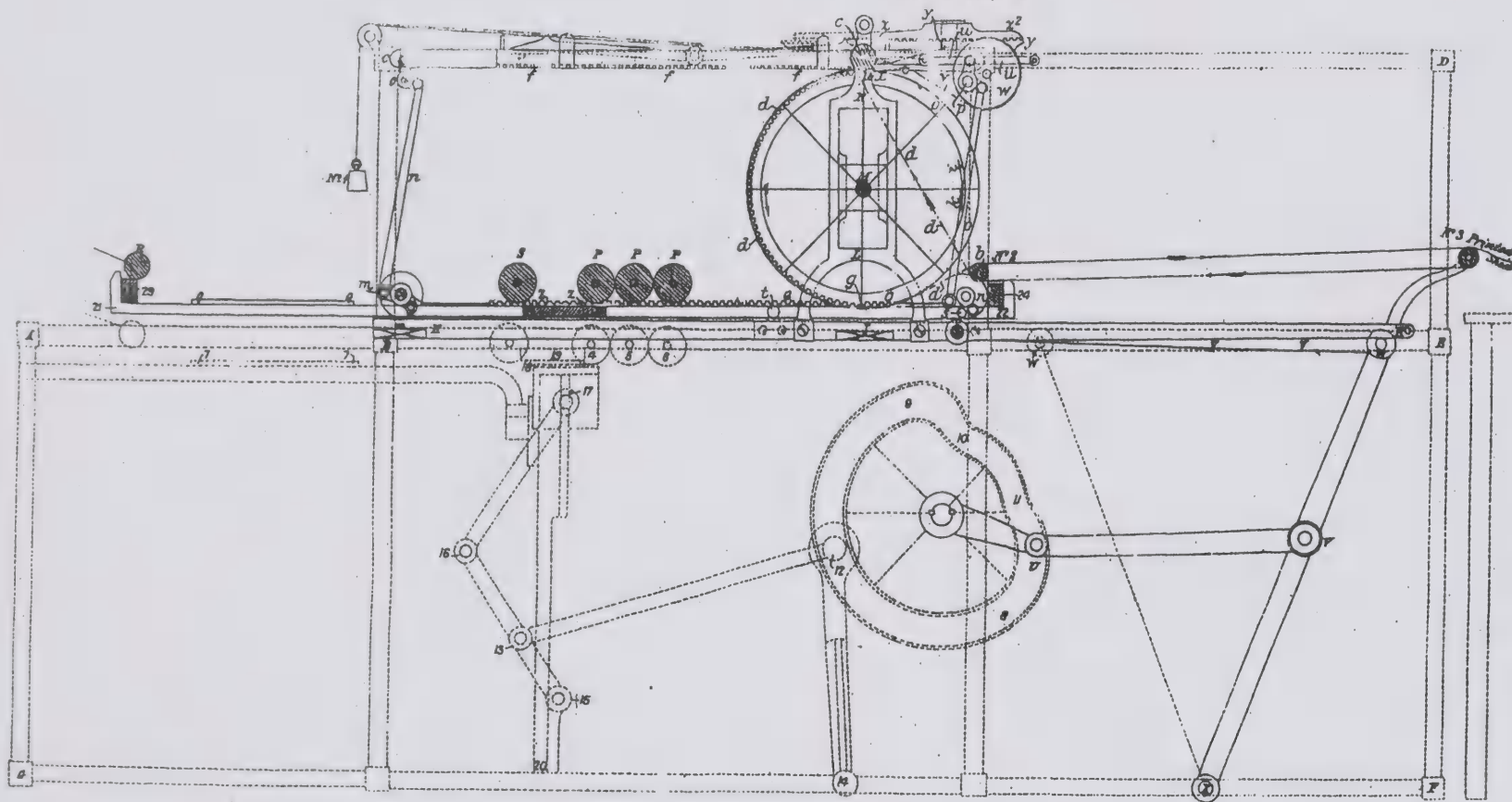
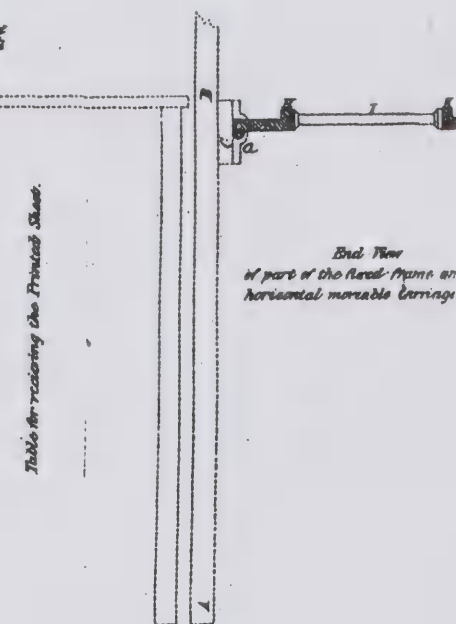


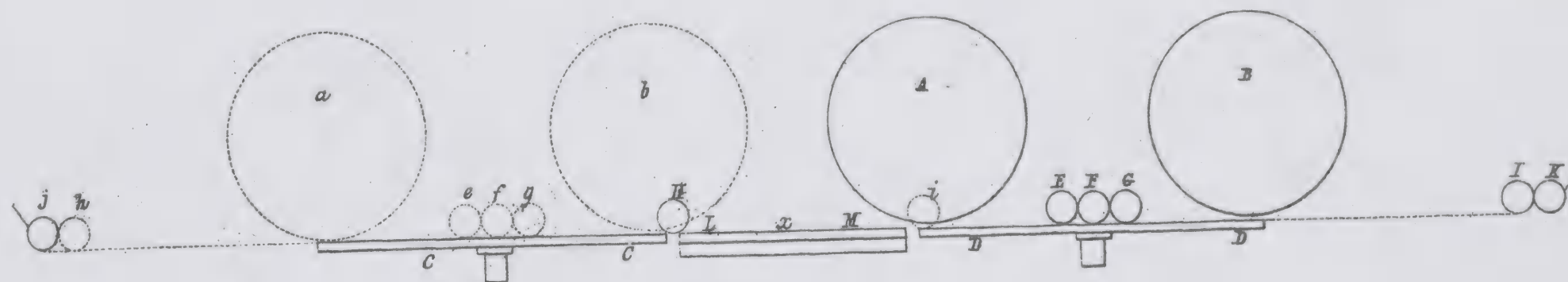
FIG. 2. Diagram.



PATENT
11521

A.D. 1820. DEC. 22. N^o 4521.
CONGREVE'S SPECIFICATION.
(2nd Edition)

(3 SHEET
SHEET 1.



The enrolled drawing is not colored

Malby & Sons, Phs

FIG. 1. Diagram.

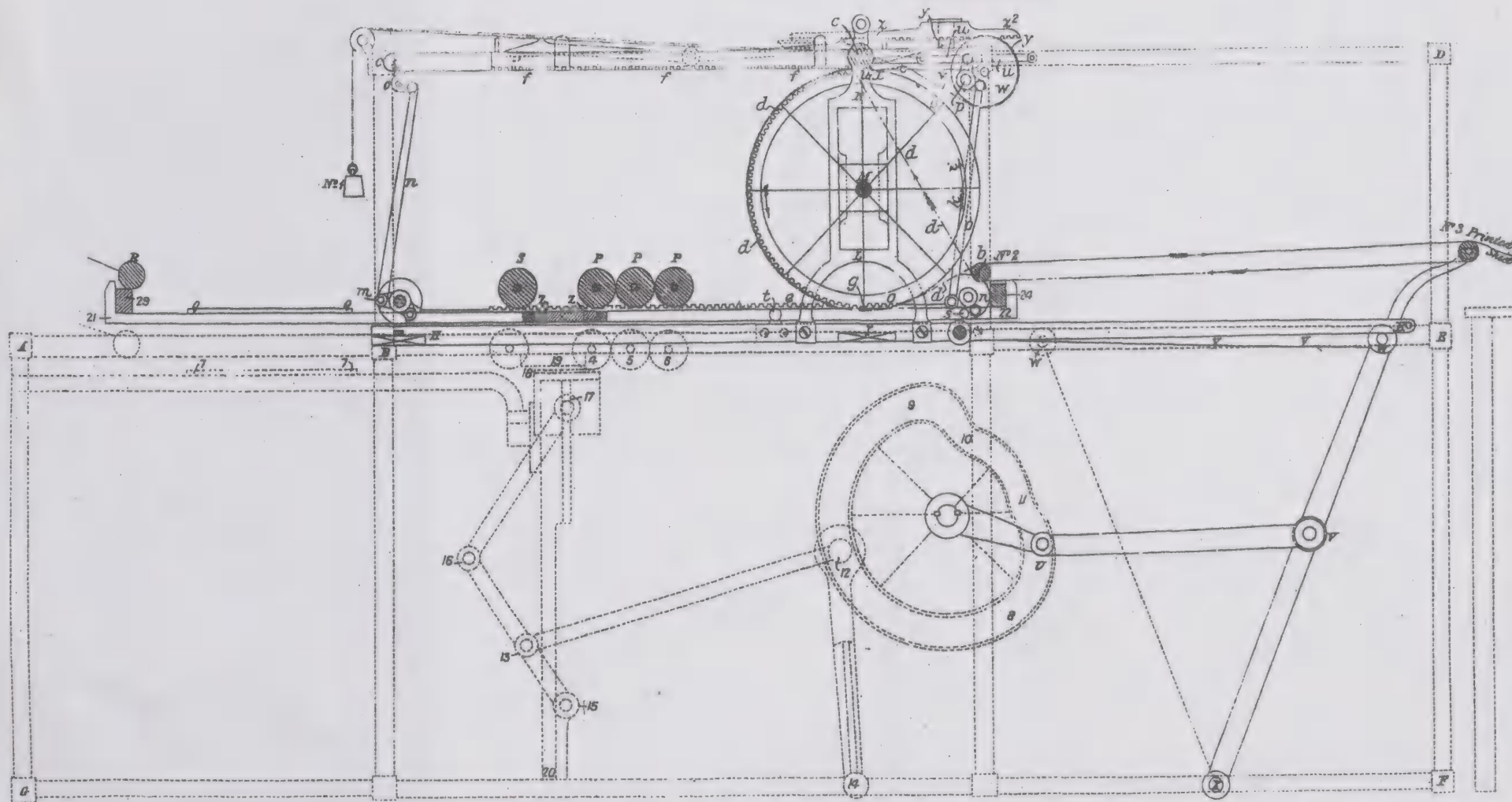
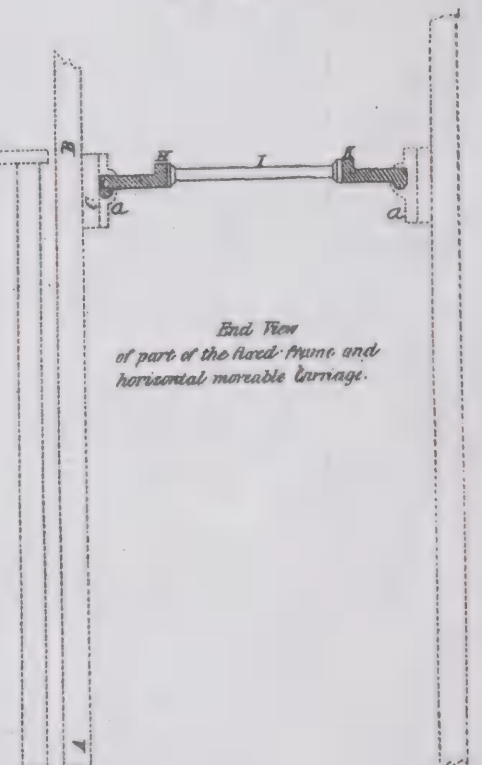


FIG. 2. Diagram.

Table for receiving the Printed Sheet.



End View
of part of the fixed frame and
horizontal movable carriage.

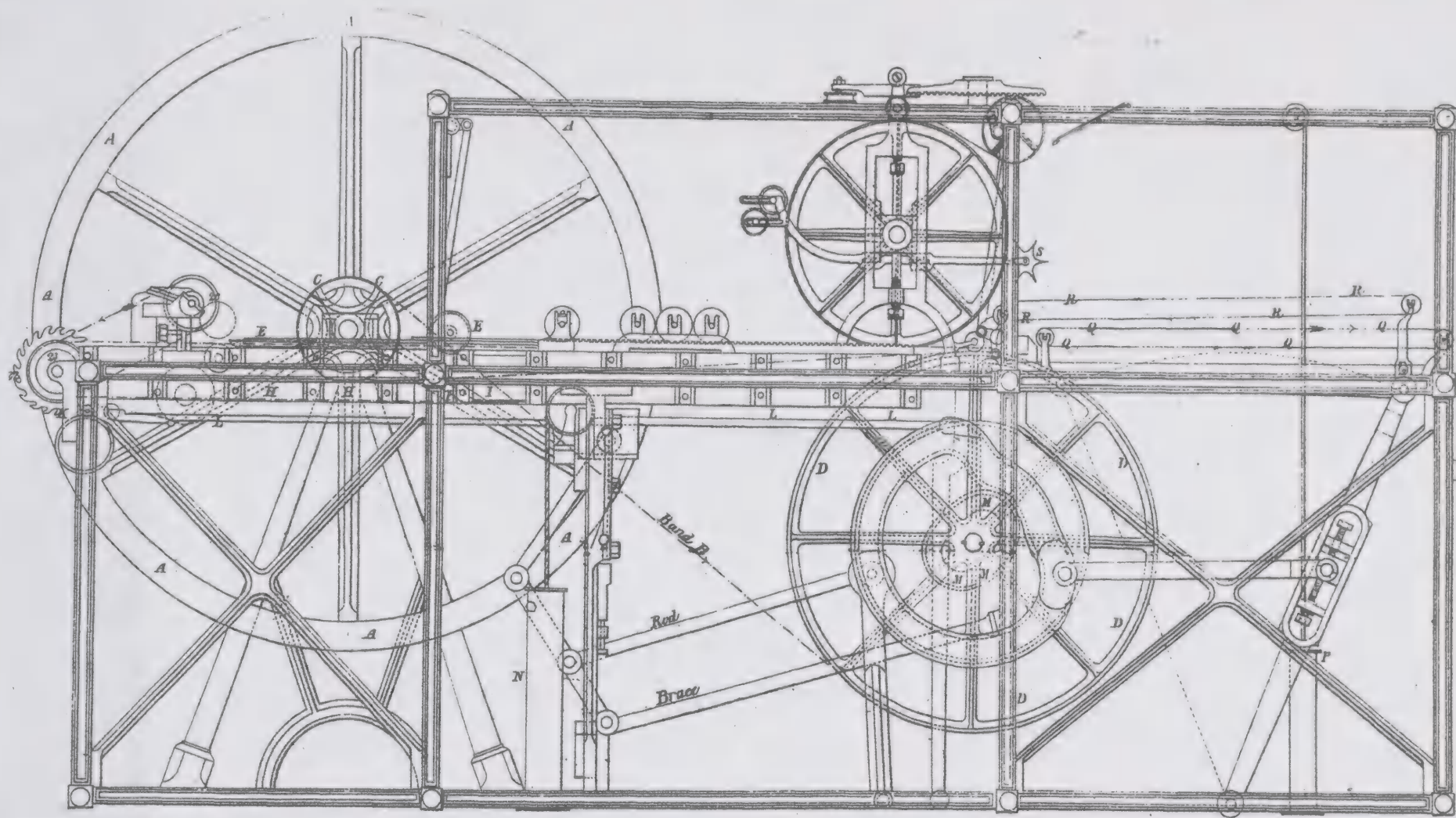
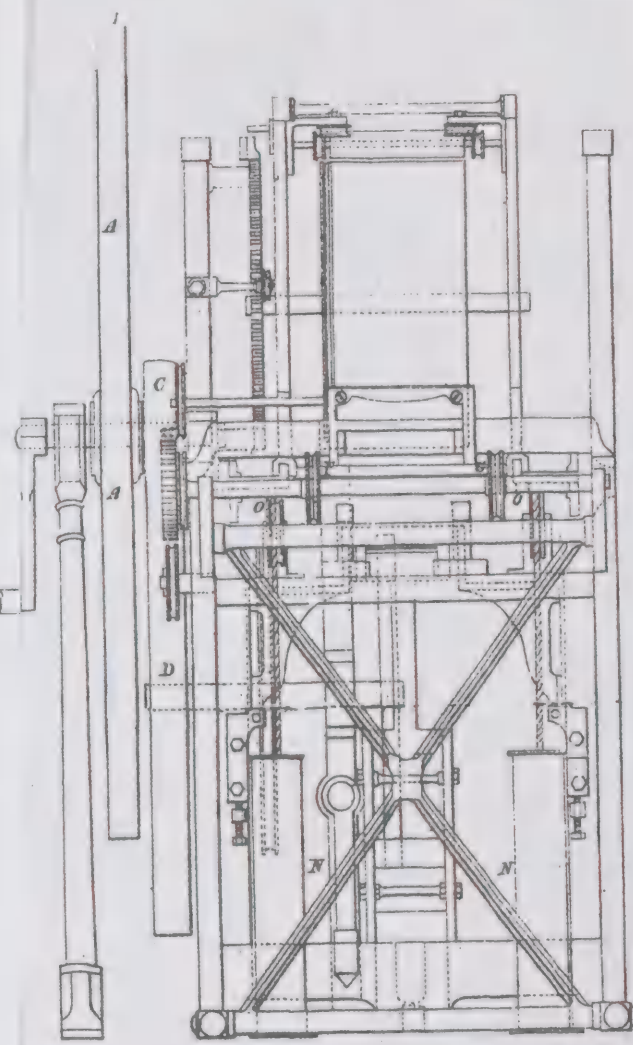
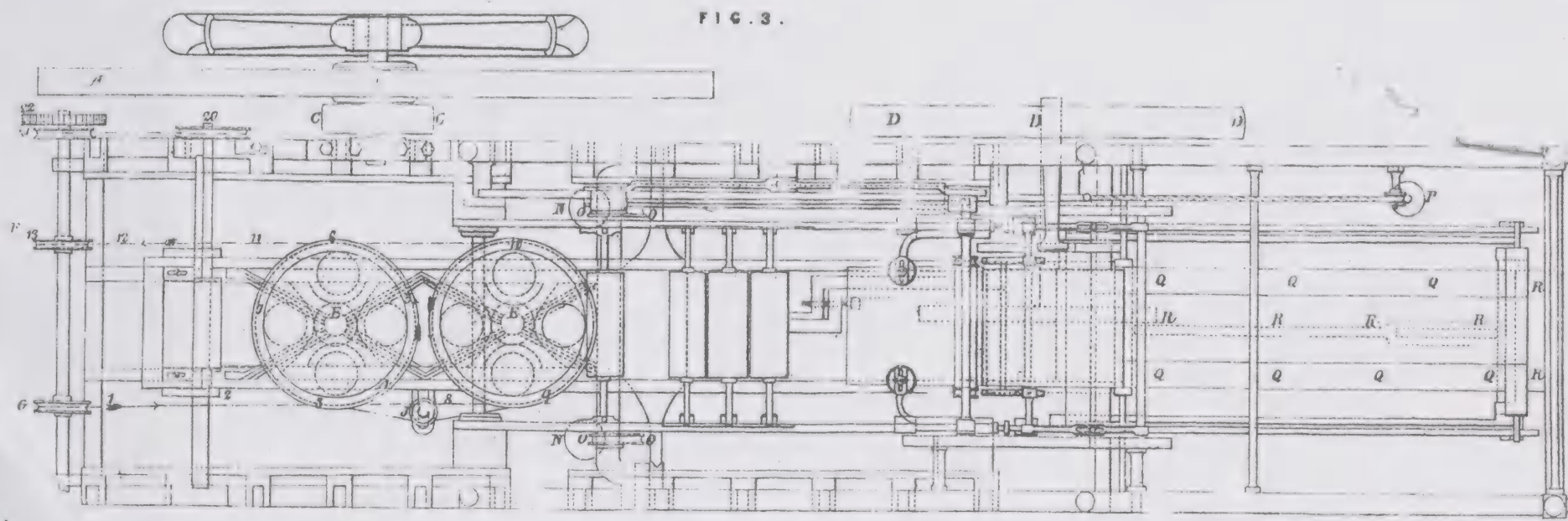


FIG. 3.





E.N.
A.D. 1822 N° 4642.

Manufacture of Stereotype Plates.

SIR W. CONGREVE'S SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, Sir WILLIAM CONGREVE, of Cecil Street, Strand, in the County of Middlesex, Baronet, send greeting.

WHEREAS His most Excellent Majesty King George Fourth did, by His
5 Letters Patent under the Great Seal of that part of the United Kingdom of
Great Britain and Ireland called England, bearing date at Westminster, the
Twenty-ninth day of January, One thousand eight hundred and twenty-two, in
the third year of His reign, give and grant unto me, the said Sir William
Congreve, my exors, admors, and assigns, His especial licence, full power, sole
10 privilege and authority, that I, the said Sir William Congreve, my exors,
admors, and assigns, should and lawfully might make, use, exercise, and vend,
within England, Wales, and the Town of Berwick-upon-Tweed, my Invention
of certain "IMPROVED METHODS OF MULTIPLYING FAC-SIMILE IMPRESSIONS TO ANY
EXTENT;" in which said Letters Patent there is contained a proviso, that
15 if I, the said Sir William Congreve, shall not particularly describe and ascertain
the nature of my said Invention, and in what manner the same is to be
performed, by an instrument in writing under my hand and seal, and cause
the same to be inrolled in His Majesty's High Court of Chancery within six
calendar months next and immediately after the date of the said Letters
20 Patent, that then the said Letters Patent, and all liberties and advantages
whatsoever thereby granted, shall utterly cease, determine, and become void,
as in and by the same (relation being thereunto had), will more fully and
at large appear.

Congreve's Improvements in the Manufacture of Stereotype Plates

NOW KNOW YE, that in compliance with the said proviso, I, the said Sir William Congreve, do hereby declare that the nature of my said Invention, and the manner in which the same is to be performed, are particularly described and ascertained in and by the following description thereof (that is to say):—

My first mode of multiplying fac-simile impressions applies principally to letterpress work, and forms a quicker and readier way of stereotyping, or producing any number of stereotype plates, than the ordinary mode of casting; the stereotype plates, according to my plan, being immediately produced by the pressure of a rolling press, and any number of these plates may be produced 10 after the matter is set up almost as rapidly as impressions may be pulled on paper in a common printing press. For this purpose a quantity of hollow letter or type, or matrices made of brass or other such metal, are provided, instead of the prominent letter or type at present used. This letter is of the same external forms and sizes as the common letter now used, so that the com- 15 positor will set up this hollow letter in the composing stick on the same principle as he would the ordinary letter for any page, with this difference, however, that it must be composed in the contrary direction. The page being then locked up in a chase or iron frame, prepared on purpose, is run through a rolling press similar to a copperplate press, but stronger, having a thin sheet 20 of prepared pewter or other soft metal fit for the purpose laid over the form, when due pressure being applied as the form and this sheet of metal pass through the press, a perfect stereotype impression, or plate answering to the form, will thus be produced by a direct and rapid operation from the letter; the work may thus be stereotyped with nearly the celerity and facility of 25 common composing and common printing, all the delay of preparing moulds, melting metal, and casting being thus entirely saved. The provision of the hollow letter will at first be more expensive, taking quantity for quantity, but as in most works the stereotype impressions may be taken by pages, and even by paragraphs, and afterwards combined for printing to any sized page or 30 for any sized sheet, the original letter or matrices being distributed as the pages or paragraphs are set up, it is evident that a very small quantity of this letter in creux would supply the place of a very extensive font.

My second plan for the multiplication of fac-simile impressions applies to copperplate work, and is not limited in dimensions like the plans at present 35 in use the original may be engraved on a flat surface of any size, and transferred to a second flat surface also of any size, and from thence laid down as copies of the original upon any number of other flat surfaces by the use of plates of different gradations of hardness, as hard and soft steel, and copper, or

Congreve's Improvements in the Manufacture of Stereotype Plates.

soft steel, copper, or brass, and pewter. To effect this it only requires that the second flat surface employed should be a thin plate, when a sufficient pressure will be obtained to produce the transfers, whatever may be the dimensions of the plate, by merely passing the plate through a rolling press or mill, such as that
 5 above mentioned for producing the stereotype fac-similes, the rollers of which need not exceed three or four inches in diameter; the size of the plates whereof the fac-similes may thus be multiplied is evidently not limited, as it necessarily is where the second impression is taken upon the outside of a cylinder.

10 In witness whereof, I, the said Sir William Congreve, have hereunto set my hand and seal, this Twenty-seventh day of July, in the year of our Lord One thousand eight hundred and twenty-two.

WILLIAM (L.S.) CONGREVE.

AND BE IT REMEMBERED, that on the Twenty-seventh day of July, in
 15 the year of our Lord 1822, the aforesaid Sir William Congreve came before our said Lord the King in His Chancery, and acknowledged the Specification aforesaid, and all and every thing therein contained and specified, in form above written. And also the Specification aforesaid was stampd according to the tenor of the Statute made for that purpose.

20 Inrolled the Twenty-seventh day of July, in the year of our Lord One thousand eight hundred and twenty-two.

LONDON:

Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
 Printers to the Queen's most Excellent Majesty. 1857.



A.D. 1824 N° 4898.

Stamping Paper, Vellum, Leather, &c.

SIR W. CONGREVE'S SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, Sir WILLIAM CONGREVE, of Cecil Street, Strand, in the County of Middlesex, Baronet, send greeting.

WHEREAS His most Excellent Majesty King George the Fourth did,
5 by His Letters Patent under the Great Seal of that part of the United Kingdom of Great Britain and Ireland called England, bearing date at Westminster, the Seventh day of February, in the fifth year of His reign, give and grant unto me, the said Sir William Congreve, my exors, admors, and assigns, His especial licence, full power, sole privilege and authority,
10 that I, the said Sir William Congreve, my exors, admors, and assigns, during the term of years therein mentioned, should and lawfully might make, use, exercise, and vend, within England, Wales, and the Town of Berwick-upon-Tweed, and also in all His Majesty's Colonies and Plantations abroad, my Invention of "AN IMPROVED METHOD OF STAMPING;" in which said Letters
15 Patent there is contained a proviso that if I, the said Sir William Congreve, shall not particularly describe and ascertain the nature of my said Invention, and in what manner the same is to be performed, by an instrument in writing under my hand and seal, and cause the same to be inrolled in His Majesty's High Court of Chancery within six calendar months next and
20 immediately after the date of the said Letters Patent, that then the said Letters Patent, and all liberties and advantages whatsoever thereby granted, shall utterly cease, determine, and become void, as in and by the same relation being thereunto had, will more fully and at large appear.

Sir W. Congreve's Improved Method of Stamping.

NOW KNOW YE, that in compliance with the said proviso, I, the said Sir William Congreve, do hereby declare that the nature of my said Invention, and the manner in which the same is to be performed, are particularly described and ascertained in and by the following description thereof; my said Invention is described in manner following, that is to say:—

It consists of a mode of stamping paper, vellum, leather, or other suitable substance, so as in one single impression to unite with the embossed work usually given in stamping the most beautiful and delicate printed figures, either in one or more coloured inks, or in silver or gold. This mode of stamping is either applicable to the protection of the revenue, or generally, to increase the security of any document against forgery, or for ornamental works in general. Thus it may be applied to the stamping of receipts, bills of exchange, bank notes, &c.; or it may be used for the borders of country or other bank notes, so as to make their forgery very difficult; or it may be used for ornamental borders to tickets, cards, or papers of any sort, and also for ornamenting leather, vellum, and all other such materials which are combined in chairs, screens, or other descriptions of ornamental furniture. Now, the difficulty involved in this process, and the security arising from it when applied as a protection against forgery, is, that to produce the embossed work in high perfection the paper must be stamped dry, which, as the fine and delicate printing used must be performed at the same instant as the embossing, on account of the register between the embossed work and the printing, involves the well-known difficulty of printing very fine work in perfection on dry paper, sized for the purpose of being written on. To overcome this difficulty I have found it necessary not only to use a press of very great power, but to impress the paper between two metallic surfaces or other suitable hard substances, instead of between a metallic and leather surface, as in common stamping. The force or counterpart of the die must, therefore, be a permanent impression and not a temporary one, as in the common mode. Thus a steel die requires a copper force, which must in the first instance be struck as a modal from the die, and thus involves an additional and difficult process in the preparation of the engine necessary for such a stamp, while it is obvious also that the press or engine must in every part of it be one of extremely nice construction and adjustment to ensure these two metallic counterparts, the steel die and its copper force coming together at every impression without injury to either; these are evidently difficulties requiring very expensive and nice machinery, the whole of which are involved by the simple union of printing and embossing at one impression, as above stated, while in forming the devices for such stamps care must be taken so to

Sir W. Congreve's Improved Method of Stamping

intermix the printing with the embossing that the delicacy of the register shall prevent these operations being performed separately. To separate them indeed, so as to perform the embossing dry and the printing wet by ordinary means, would evidently render it impossible to preserve any union or register
 5 on a complicated and well-mixed device from the shrinking or expansion of the paper in drying or in wetting between the two operations. In stamps and other securities of higher value I unite the register of different colours with that of the embossed work, by means of my compound plate or die, which is already the subject of a Patent, and thus had a further combination of
 10 difficulty to oppose the forger. The extreme precision of register in these two heterogeneous operations is not, of course, of so much importance in the ornamental work; nevertheless, its beauty and perfection must recommend it, even its application to these purposes, such as the embossing and gilding or silvering vellum, leather, or such other materials for furniture, to which
 15 such work is applicable, while at the same time the combining of these two operations in one gives a celerity to the process, and thereby ensures economy as well as perfection.

In witness whereof, I, the said Sir William Congreve, have hereunto set my hand and seal, this Seventh day of August, One thousand
 20 eight hundred and twenty-four.

WILLIAM (L.S.) CONGREVE.

AND BE IT REMEMBERED, that on the ~~Seventh day of August~~, in the year of our Lord 1824, the aforesaid Sir William Congreve came before our said Lord the King in His Chancery, and acknowledged the Specification
 25 aforesaid, and all and every thing therein contained and specified, in form above written. And also the Specification aforesaid was stamped according to the tenor of the Statute made for that purpose.

TROVER.

Inrolled the Seventh day of August, in the year of our Lord One thousand eight hundred and twenty-four.

LONDON:

Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
 Printers to the Queen's most Excellent Majesty. 1857.

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